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**Mathematical Association of Tasmania (MAT) Conference**

***Expanding Your Horizons***

**Conference Programme**

**Penguin High School, 10th and 11th May 2013**

*MAT would like to thank AMC, our major event sponsor, for their generous support.*

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**Welcome**

Welcome to Mathematical Association of Tasmania’s annual conference for 2013. If you are unfamiliar with Penguin High School, please look at the provided map in the appendix (last page) to help you orient yourself around the labyrinth of rooms at this school. When you walk around the school, you will notice each room is labelled with a blue sign to help you identify the room number.

Toilets are also located around the school – they are labelled as “M T” (male toilet) or “F T” (female toilet) as appropriate on the map. The various meals provided are served in the Stallholder’s Area which is the large room in the middle of the school.

Please make sure you collect your name badge from the registration desk, as it lets us know who has arrived. In the unlikely event of an emergency evacuation, please assemble at the green emergency assembly point located at the top end of the main oval near the car park.

We will try and sensibly locate chairs around the school, but you may need to take your chair from location to location depending on numbers of people attending various sessions. Don’t worry about where you leave your chair – we will all put the chairs back in the proper location after the end of the conference!

Please hand in your name badge at the end of the conference to go in the prize draw. Good luck!

**Friday afternoon programme**

|  |  |
| --- | --- |
| 3 pm onwards | Registrations (front office) |
| 3.45 pm to 4.15 pm | Afternoon Tea – Stallholder’s Area |
| 4.15 pm to 5.15 pm | *Workshops:* |
| Room 3: **Denise Neal (K-3):** Encouraging young learners to explain and reason using mathematical vocabulary. |
| Room 2: **Tino Delbourgo (4-6):** Moving beyond mental computations to meaningful, connected written methods. |
| Room 5: **Helen Chick (7-9):** Ideas beyond measure for Grades 7-9. |
| Room 10: **Gary Anderson (10-12):** What’s happening with Senior Secondary Maths and some interesting/challenging pedagogical ideas. |
| Room 7: **Peter Fox (9-12):** Rich investigations. |
| Room 6: **Birsin Reynolds (3-9):** Mathematically rich tasks to develop engagement, thinking, reasoning and understanding. |
| 5.15 pm to 6.15 pm | *Room 1:* ***Anthony Harradine – keynote speaker*** |
| 6.45 pm onwards | Conference Dinner at **Ulverstone Pier 01 Restaurant**\* (serving of entrees will start at 7.30 pm) |

\*Ulverstone Pier 01 Restaurant is located at 3 Wharf Rd, Ulverstone. It is on the east side on the Leven River just after the bridge and a little beyond the top of Ulverstone’s main street (Reibey St) on the water’s edge. Please refer to the appendix to see the dinner menu.

**Saturday day programme**

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| --- | --- |
| 7.45 am to 8.45 am | Registrations (front office) and Breakfast (Stallholder’s Area) |
| 8.45 am to 9.15 am | Opening session workshop |
| 9.15 am to 10.15 am | *Room 1:* ***Joanne Mulligan – keynote speaker*** |
| 10.15 am to 11.15 am | *Workshop Sessions 1:* |
| Room 10: **Richard Korbosky (K-2):** Developing flexible thinkers in mathematics. |
| Room 3: **Julie Mitchell (3-8):** Unlocking mathematical thinking |
| Room 9: **Mark Sivills (3-12):** Innovative teaching techniques |
| Room 6: **Greg James (7-10):** Making accurate judgments of A, B, C, D, E ratings when using the Australian Curriculum |
| Room 7: **Peter Fox (7-12):** Mathemagicians exposed |
| Room 5: **Ally Dowson and Brett Stephenson (5-10):** Meaningful measurement |
| Room 4: **Russell Brown (7-12):** Modelling linear equations using practical examples |
| Room 1: **Louise Hodgson (K-3):** Helping children to connect counting with the construction of base ten ideas. |
| Room 8: **Renee Hoareau (K-12):** Connect with Maths Project |
| Room 2: **Anthony Harradine (9-11)**: Ways to think about quadratics |
| 11.15 am to 11.45 am | Morning tea – Stallholder’s Area |
| 11.45 am to 12.45 pm | *Workshop Sessions 2:* |
| Room 10: **Richard Korbosky (K-3):** Mathematical games in the K-3 classroom. |
| Room 6: **Michelle Button (7-10):** Mangahigh: The most engaging digital maths resource in your classroom |
| Room 8: **Toni Popowski (K-6):** Virtual maths trail |
| Room 9: **Sharyn Livy (3-8):** Reasoning: What should we know? |
| Room 3: **Helen Cooke (7-12):** Creating video tutorials for your maths class – a quick and easy step by step guide. |
| Room 4: **Russell Brown (7-12):** A novel approach to studying transformations of graphs. |
| Room 7: **Peter Fox (3-12):** Making mathematics memorable. |
| Room 1: **Helen Chick (7-9):** Ideas beyond measurement for Grades 7-9. |
| Room 5: **Vikram Garaniya and Christopher Chin (9-12):** Demonstration of the new Maritime Engineering Maths in Schools microsite for teachers and students. |
| Room 2: **Joanne Mulligan (K-2):** Promoting mathematical thinking through pattern and structure. |
| 12.45 pm to 1.45 pm | Lunch – Stallholder’s Area(including MAT Annual General Meeting at 12.45 pm in the staff room) |

|  |  |
| --- | --- |
| 1.45 pm to 2.45 pm | *Workshop Sessions 3:* |
| Room 10: **Richard Korbosky (4-7+):** Mathematics games in the 4-7+ classroom. |
| Room 8: **Mark Sivills (3-12):** Comment only marking. |
| Room 6: **Brett Stephenson (7-12):** Matrices in action. |
| Room 5: **Jane Watson (3-6):** Measurement and Data. |
| Room 3: **Robyn Reaburn (9-12):** Modelling algebra with algebra tiles. |
| Room 1: **Denise Neal (K-3):** Encouraging young learners to explain and reason using mathematical vocabulary. |
| Room 9: **Gary Anderson (10-12):** What’s happening with Senior Secondary Maths and some interesting/challenging pedagogical ideas. |
| Room 4: **Noleine Fitzallen (5-8):** When does 1/2 = 1/3? Modelling with wet fractions. |
| Room 7: **Birsin Reynolds (3-9):** Mathematically rich tasks to develop engagement, thinking, reasoning and understanding. |
| Room 2: **Anthony Harradine (K-12):** My daughter, 148 slater bugs and statistical inference. |
| 2.45 pm to 3.00 pm | Close |

**Conference Abstracts**

**Friday Workshop Sessions – 4.15pm to 5.15pm**

**Denise Neal (K-3):** ***Encouraging young learners to explain and reason using mathematical vocabulary.***

The Australian Curriculum mathematics expects students at all year levels to develop key proficiencies of understanding, reasoning, fluency and problem solving. In order to develop these mathematical behaviours and dispositions, they need experiences in using appropriate mathematical language and particular subject-specific vocabulary. This workshop will focus on some practical strategies to help teachers focus on these ideas in K-3 settings.

**Tino Delbourgo (4-6):** ***Moving beyond mental computations to meaningful, connected written methods.***

In this session I will discuss and provide hands-on opportunities to practise several strategies that I have found can assist students operating at a Grade 4-6 level in mathematical thinking/skills to transfer their knowledge of mental computations into written methods that will hopefully remain in their long term memory.

**Helen Chick (7-9): *Ideas beyond measure for Grades 7-9.***

This workshop will incorporate a variety of activities intended to build understanding of perimeter, area, surface area, and volume. These will develop conceptual understanding, facilitate problem-solving skills, foster reasoning and communication, and allow the exploration of relationships among the concepts. The activities can be adapted to suit a variety of student abilities.

**Gary Anderson (10-12):** ***What’s happening with Senior Secondary Maths and some interesting/challenging pedagogical ideas.***

This session will be divided into two parts: firstly,’ integrating ACARA content into our Senior Secondary Courses in 2014’. Regardless of what we may or may not know, hopefully I can point you towards some texts and other resources that may help you plan for the future. The second part is ’Improving Learning in Senior Mathematics’. I will look at some possible collaborative learning strategies of the UK educator, Malcolm Swan, that you might like to find out more about. Some could challenge and some will complement what you already do.

**Peter Fox (9-12): *Rich investigations.***

Textbooks are filled with directed questions focused largely on the development of a single skill. While these questions have their place, they can develop an ‘impatience for irresolution’. Rich investigations can be scaffolded to cater for a range of abilities and cover a multitude of skills. Investigations in this workshop incorporate a range of technologies with content applicable to the middle and senior secondary mathematics curriculum.

**Birsin Reynolds (3-9):** ***Mathematically rich tasks to develop engagement, thinking, reasoning and understanding.***

In maths education across Australia there is a strong and definite shift in emphasis towards a more open-ended investigative approach. This shift is entirely logical as the wider community wants students who have a toolbox of algorithmic skills but more importantly who can also think, reason and solve problems with those skills.

Many examples of practical and immediately useable classroom activities have evolved from across Australia in response to this changing emphasis. Features of the lessons include open-ended investigative approaches, cooperative group work, meaningful contexts, use of technology, concrete materials, kinaesthetic opportunities, catering for range of students’ abilities and seeking genuine understandings.

**Friday Keynote Speaker: Anthony Harradine**

***Presentation title: Spoilt for choice***

Now more than ever before we mathematics teachers are spoiled for choice.

There is an abundance of people sharing the fruits of their labour that focus(ed) on trying to figure out what is best when it comes to students learning mathematics. We also have a new Australian Curriculum.

It seems, however, impossible to everything that everyone says! So who should we listen too? How do we decide?

I have tried to find a simple way to think about what is possible/desirable, from a big picture/mathematical point of view.

It helps me to figure out what I accept and what I do not accept when people share their fruits. I will do my best to describe my simple way to think about teaching mathematics through the sharing of a few key activities that shine light on the big targets I hope to hit. In addition to this, I will list the hard questions that torment my mind continually; and suggest some answers, to see if you agree.

*Anthony is first and foremost a teacher who dabbles in other areas of education. He has spent the last seven years trying to better understand his failures of the previous twenty. His many mentors have taught him a lot about mathematics and statistics, problem solving, and research. He likes nothing better than sharing what he has learned with anyone silly enough to listen.* *Currently, among many other things, Anthony is focusing on how we as teachers can best support students to develop ways-of-thinking that are fruitful when it comes to developing a deep understanding of the things our curriculum outlines. While he is clearly a maths-nut, his work transcends all curriculum areas and led to him developing a web application that provides an environment within with ways-of-thinking can evolve.*

**Saturday Keynote Speaker: Joanne Mulligan**

***Presentation title: Promoting mathematical thinking through pattern and structure***

Mathematics learning for all children can inspire mathematical thinking through understanding patterns and relationships. This presentation provides a framework for promoting mathematics learning through a pattern and structure approach across all strands of the mathematics curriculum. With a focus on patterns and pre-algebra the implementation of the Pattern and Structure Mathematics Awareness Project in Australian schools will be exemplified beginning in the first year of schooling. Assessment tasks forming the basis of an interview (Pattern and Structure Assessment), and pattern-eliciting tasks involving children in modelling, representing, visualising and recording are discussed. Implications for pedagogy and curriculum to promote early algebraic thinking are raised.

*Joanne Mulligan is Associate Professor of Education, in the Department of Education, Faculty of Human Sciences at Macquarie University, Sydney where she leads research projects, teaches mathematics and science education in undergraduate programs and supervises research students. Joanne is internationally renown for research in early mathematical development. She currently leads Australian Research Council projects, Reconceptualising Early Mathematics Learning and Transforming Children’s Mathematical and Scientific Reasoning and is chief investigator in the Improving numeracy outcomes for young Indigenous children through the Patterns and Early Algebra Preschool (PEAP) Professional Development Program.*

**Saturday Workshop Sessions 1 – 10.15am to 11.15am**

**Richard Korbosky (K-2):** ***Developing flexible thinkers in mathematics.***

The ability to think flexibly in mathematics is an important skill to acquire from the start of the mathematics journey. Young students should be given the opportunity to manipulate materials, draw the mathematics, communicate their knowledge, and link the learning to symbols and to number sentences. There are many graphic organisers which assist and organise their thinking. This session explores a variety of strategies and will arm the participants to return to the classroom with new ideas about flexible thinking.

**Julie Mitchell (3-8):** ***Unlocking mathematical thinking.***

Unless we know what our students already understand about mathematics, how can we begin to plan what we need to teach? Using the strategies and routines devised by Ron Ritchhart, (Senior Research Associate, Project Zero, Harvard Graduate School of Education), I would like to share some highly effective routines that can help to unlock the mathematical thinking of our students. These routines allow students to make their thinking visible and quickly highlight both their understanding and misunderstanding of mathematical concepts.

There has also been a remarkable shift in the attitudes, confidence, motivation and participation levels of my students. A ‘thinking’ classroom engages all students in the thinking and learning process; allows all students to experience success; allows all students to make mistakes, change their thinking and adjust their conclusions.

**Mark Sivills (3-12):** ***Innovative teaching techniques.***

An interactive session demonstrating various Assessment for Learning and Kagan Collaborative Learning strategies including:

* Use of Mini-whiteboards
* No hands up rule
* Rally Coach
* Quiz-quiz-trade
* Hinge Questions
* Sometimes-Always-Never
* Traffic Light Assessment
* Think-Pair-Share
* Tarsia Jigsaws
* ABC plenaries
* Exit Passes
* And more if we have time…

These are tried and tested techniques that promote discussion, collaboration and individual accountability in the classroom, and are also a lot of fun!

**Greg James (7-10):** ***Making accurate judgments of A, B, C, D, E ratings when using the Australian Curriculum.***

Teachers want to be able to make accurate and efficient judgements of A, B, C, D, E ratings when using the Australian Curriculum. Two documents and some processes to help make these judgements will be shared in this workshop. These documents and processes have been developed by the Prospect High School Maths Team as they have grappled with the issues of making fair and efficient assessments of student understanding when using the Australian Curriculum.

**Peter Fox (7-12):** ***Mathemagicians exposed.***

Mathemagicians have two personas. The mentalist possesses amazing computational powers and the illusionist with apparent mind reading capabilities. Just like their theatrical cousins, it’s all an illusion. This workshop exposes the tricks, not for evil reasons, rather to allow teachers the opportunity to perform these mathematically tricks with their own classes.

**Ally Dowson and Brett Stephenson (5-10):** ***Meaningful measurement.***

The presentation would be a mixture of two tasks which are presently being used by workplace maths teachers: a housing measurement activity where the students design their dream house firstly using estimation then using scale drawing, paper models and Google sketch up to create their design. They also figure out how much their house would cost to carpet and paint and assess how reasonable their plan is. The second activity is the Baby in the Car activity which looks at surface area of adults and children in relation to heat loss.

**Russell Brown (7-12):** ***Modelling linear equations using practical examples.***

Participants will use a simple practical task that involves small group class participation to model a linear relationship and relate the gradient and the y-intercept to the practical situation. This task covers many content dot points as well as differing learning styles. Modelling techniques will include linear regression and by eye lines of best fit. This task is suitable for MS Excel or most graphical software including graphics calculators.

**Louise Hodgson (K-3):** ***Helping children to connect counting with the construction of base ten ideas.***

Counting plays a key role in constructing base ten ideas about quantity and connecting these concepts to symbols and oral names for numbers. A complete understanding of place value develops across P - 6, however the most critical period in this development is P - 3. Most importantly, children begin to think of groups of ten things as a unit. Participants will workshop teaching strategies for enhancing children’s understandings.

**Renee Hoareau (K-12):** ***Connect with Maths Project.***

The Connect with Maths Project aims to build a dynamic education community to support Australian teachers of mathematics in intuitive, personalised and flexible ways. Teachers will access a range of networks and activities that support quality contemporary learning in the context of the implementation of mathematics in the Australian Curriculum. The Connect with Maths project is funded by the Australian Government Department of Education, Employment and Workplace Relations through the Mathematics and Science Participation Program.

**Anthony Harradine (9-11)**: ***Ways to think about quadratics.***

Quadratics form a significant chunk of the secondary school curriculum. Having ways to think about quadratics (as opposed to simply ways of doing things to quadratics) may be of great assistance to learners. This workshop will share how to bestow a number of ways of thinking that seems to assist in making sense of this chunk.

**Saturday Workshop Sessions 2 – 11.45am to 12.45pm**

**Richard Korbosky (K-3):** ***Mathematical games in the K-3 classroom.***

The Number Games support essential mathematics learning, teaching and assessment principles, co-operative learning, thinking skills; student centered learning classrooms, independent learning and differentiation of the mathematics learning environment. The number knowledge in the games ranges from early whole number for 5 year olds through to the use of addition, subtraction, multiplication, division, money, some fractions and algebraic thinking for 8/9 year olds.

**Michelle Button (7-10):** ***Mangahigh: The most engaging digital maths resource in your classroom.***

Mangahigh has revolutionised the way we engage students in our maths classrooms. With interactive games and clever adaptive quizzes, you will see dramatic improvements in your students’ attitudes towards learning maths, and their learning outcomes.

For teachers, imagine setting differentiated tasks to your students easily; identify struggling students in real-time and providing helpful intervention remotely; a program that automatically creates a personalised learning pathway for each student, and then adapt that pathway to complement the lessons that you set for your students manually. All this, and more, is possible with Mangahigh.com - one of the world's fastest growing online maths resources.

**Toni Popowski (K-6):** ***Virtual maths trail.***

In 2012, the Circular Head Federation worked together to produce a virtual maths trail. Students can now “visit” other schools and be involved in rich mathematical tasks without leaving their classrooms. Come along to this workshop and find out about the process and see the finished product. Also find out about the benefits of using Maths trails in your school.

**Sharyn Livy (3-8):** ***Reasoning: What should we know?***

During our teaching we should be thinking about how learners represent and connect pieces of knowledge and this includes the development of their reasoning strategies. We want students to think logically about the relationships amongst concepts and situations. Teachers can promote mathematical reasoning by asking students key questions to explain how they reached their answers. This presentation has two aims: one is to share the language of reasoning that helps promote students’ mathematical understanding; the other is to share different tasks that can be used to foster students' ability to think logically about the relationships among mathematical concepts and situations.

**Helen Cooke (7-12):** ***Creating video tutorials for your maths class – a quick and easy step by step guide.***

Creating maths video tutorials opens the door to different and exciting ways of learning. Salman Khan though his *Khan Academy* has created an online phenomenon, creating tutorials that have been viewed over 180 million times to date. Creating your own video tutorials allows you to tailor them to your students’ needs, for the purposes of students catching up when absent, reinforcing concepts and revising prior to tests. Incorporating calculator steps into your tutorials further enhance students’ understanding. Helen will show you how to create quick and easy tutorials, including calculator displays, using a document camera and TechSmith’s inexpensive *SnagIt* software.

**Russell Brown (7-12):** ***A novel approach to studying transformations of graphs.***

This task is a fun, non-threatening introduction to transformations of graphs including reflection, dilation and translation utilising standard graphing software including graphics calculators. Initially the session will transform student generated scatterplot shapes to develop suitable techniques and understanding. These key points will then be used to transform functions. The main focus of the session will be developing an understanding of transformations before the study of functions.

**Peter Fox (3-12):** ***Making mathematics memorable.***

What on earth were the students doing last lesson? They haven’t remembered any of it!” If you have every experienced this thought, you’re not alone. There are many reasons why students may forget content previously covered, even if they appeared to know it at the time. This workshop explores some of the functions of the brain promote learning, understanding an increase memory retention. You don’t need a degree in Neuroscience to benefit from the experience. Examples used will cater for a range of levels from Grade 3 – Year 12.

**Helen Chick (7-9):** ***Ideas beyond measurement for Grades 7-9.***

This workshop will incorporate a variety of activities intended to build understanding of perimeter, area, surface area, and volume. These will develop conceptual understanding, facilitate problem-solving skills, foster reasoning and communication, and allow the exploration of relationships among the concepts. The activities can be adapted to suit a variety of student abilities.

**Vikram Garaniya and Christopher Chin (9-12):** ***Demonstration of the new Maritime Engineering Maths in Schools microsite for teachers and students.***

With a major reduction in the number of students studying pre-tertiary mathematics, we attempt to motivate and inspire students to continue with their mathematics studies. A new interactive website and package has been developed by the Australian Maritime College for both students and teachers, which includes real world applications of integral calculus, differential equations, trigonometry and data analysis, all linked to the current mathematics curriculum for Australian years 9 to 12. Our presentation will include how to use the new maths in schools microsite to enhance your student's learning in your classroom.

**Joanne Mulligan (K-2):** ***Promoting mathematical thinking through pattern and structure.***

Mathematics learning for all children can inspire mathematical thinking through understanding patterns and relationships. This presentation provides a framework for promoting mathematics learning through a pattern and structure approach across all strands of the mathematics curriculum. With a focus on patterns and pre-algebra the implementation of the Pattern and Structure Mathematics Awareness Project in Australian schools will be exemplified beginning in the first year of schooling. Assessment tasks forming the basis of an interview (Pattern and Structure Assessment), and pattern-eliciting tasks involving children in modelling, representing, visualising and recording are discussed. Implications for pedagogy and curriculum to promote early algebraic thinking are raised.

**Saturday Workshop Sessions 3 – 1.45pm to 2.45pm**

**Richard Korbosky (4-7+):** ***Mathematics games in the 4-7+ classroom.***

The Number Games support essential mathematics learning, teaching and assessment principles, co-operative learning, thinking skills; student centered learning classrooms, independent learning and differentiation of the mathematics learning environment. The number knowledge in the games ranges from early decimal number for 9/10 year olds through to the use of addition, subtraction, multiplication, division, fractions, money and algebra understandings for 12/13+ year olds.

**Mark Sivills (3-12):** ***Comment only marking.***

How many times have you given a piece of marked work back with helpful comments on only to hear a chorus of “What’d you get?” as students compare the grades they got and ignore the suggestions for how they fix their work. How often have you given back work and then seen students with As and Bs sigh with relief (despite getting maybe 20 or 30% of their work wrong) and other students get visibly upset because they got Cs or worse (despite getting maybe 50% perfectly right!)

A comment only marking approach removes the ego from feedback. Students stop comparing themselves to each other – and everyone gets targeted actions that help move their learning forward, regardless of whether they got most of it wrong or most of it right. Everyone moves forward, everyone stays positive and outcomes increase!

In this session I will look at the evidence supporting a comment only marking approach, and practical suggestions for how to implement it in your classroom.

**Brett Stephenson (7-12):** ***Matrices in action.***

This workshop will look at how matrices can be incorporated into both secondary and senior secondary courses in the new Australian curriculum. The use of graphics calculators to assist with the organisation and investigation of data in areas such as food webs, Markov chains and cryptography will be demonstrated.

**Jane Watson (3-6): *Measurement and Data.***

In this workshop we will use data collected from a Year 4 classroom to illustrate the linking of descriptors from Year 4 of the ‘Measurement and Geometry’ and ‘Statistics and Probability’ sections of the Australian Curriculum: Mathematics. First the students chose one student in their class and everyone measured the student’s arm span. Later the students measured the arm spans of all students in the class. We will work with their data, create representations and discuss the opportunities to focus on the concept of variation. (If TinkerPlots is available, we will use it for some of the representations.)

**Robyn Reaburn (9-12):** ***Modelling algebra with algebra tiles.***

Despite our best efforts some students have difficulty in understanding what we do in algebra. Algebra tiles provide a visualisation for solving equations, factorisation, and multiplication for first and second degree polynomials. This workshop introduces algebra tiles and how they can be used in the classroom.

**Denise Neal (K-3):** ***Encouraging young learners to explain and reason using mathematical vocabulary.***

The Australian Curriculum mathematics expects students at all year levels to develop key proficiencies of understanding, reasoning, fluency and problem solving. In order to develop these mathematical behaviours and dispositions, they need experiences in using appropriate mathematical language and particular subject-specific vocabulary. This workshop will focus on some practical strategies to help teachers focus on these ideas in K-3 settings.

**Gary Anderson (10-12):** ***What’s happening with Senior Secondary Maths and some interesting/challenging pedagogical ideas.***

This session will be divided into two parts: firstly,’ integrating ACARA content into our Senior Secondary Courses in 2014’. Regardless of what we may or may not know, hopefully I can point you towards some texts and other resources that may help you plan for the future. The second part is ’Improving Learning in Senior Mathematics’. I will look at some possible collaborative learning strategies of the UK educator, Malcolm Swan, that you might like to find out more about. Some could challenge and some will complement what you already do.

**Noleine Fitzallen (5-8):** ***When does 1/2 = 1/3? Modelling with wet fractions.***

Many fraction activities rely on the use of area models for developing partitioning skills. These models, however, are limited in their ability to assist students to visualise a fraction of an object when the whole changes. This workshop demonstrates a fraction modelling activity that requires the transfer of water from one container to another. The activity provides the opportunity for students to explore the part-whole relationship when the whole changes and respond to and reason about the question: When does 1/2 = 1/3?

**Birsin Reynolds (3-9):** ***Mathematically rich tasks to develop engagement, thinking, reasoning and understanding.***

In maths education across Australia there is a strong and definite shift in emphasis towards a more open-ended investigative approach. This shift is entirely logical as the wider community wants students who have a toolbox of algorithmic skills but more importantly who can also think, reason and solve problems with those skills.

Many examples of practical and immediately useable classroom activities have evolved from across Australia in response to this changing emphasis. Features of the lessons include open-ended investigative approaches, cooperative group work, meaningful contexts, use of technology, concrete materials, kinaesthetic opportunities, catering for range of students’ abilities and seeking genuine understandings.

**Anthony Harradine (K-12):** ***My daughter, 148 slater bugs and statistical inference.***

I see a man on a Friday evening laying on the foot-path near the local, his false teeth peeking out of his rosy lips. What is my immediate thought? I see some NAPLAN data, represented with two box-plots, comparing the performance of two states, NSW and SA. What is my immediate thought?

It turns out that humans are habitual inferrers. But are the inferences always valid? Are the data they are based on consistent with the inferences being made? My daughter's experience with 148 slater bugs might help us to understand this murky world a little better.

**Acknowledgements**

We are grateful for the assistance of many people behind the scenes to make this event possible. In particular, the following people have made a significant contribution to the running of this event:

* Lynda Kidd (MAT Executive Committee) for setting up our online conference registration system and preparing the flyers.
* Brett Riley (MAT Executive Committee) for obtaining the participation and liaising with our keynote speakers.
* Lauren Saunders (Australian Maritime College) for the provision of the conference bags and the college’s generation sponsorship of our conference.
* Ashley Robertson (Penguin High School) and her Grade 9/10 Catering class who have provided all the delicious food for the event.

Thank you to everyone who helped to make this event happen.

Tino Delbourgo
MAT Conference Convenor 2013

**Appendix – Conference Dinner Menu**

**Entrée**

An “alternate drop” chosen from:

Cream of Roasted Pumpkin Soup - Roasted butternut pumpkin with cream, roasted hazelnuts and parsley oil.

Bruschetta – Semi-dried tomatoes, red onion and herbs with avocado, Danish fetta, rocket and balsamic glaze.

**Main Course**

An “alternate drop” chosen from:

Cape Grim Beef - char grilled scotch fillet with a caramelised onion mash, green beans and a red wine jus (served medium).

Nichols Roasted Lemon and Herb Chicken Breast - roasted chicken breast with herb and lemon crust, pork and herb stuffing, salted roasted potatoes, brocollini and pomegranate glaze.

Please note that you will need to pay for your drinks. A selection of deserts (at your own additional cost) may also be available.

**Appendix – Penguin High School Map**

Please rotate the page through 90° (or π/2 radians) anticlockwise to read this map most easily.

